$$Y = \begin{cases} 0 & \text{cured} \\ 1 & \text{not cured.} \end{cases}$$

T: survival time

model:

$$P(T>t \mid Y=1) = e^{-(\lambda t)^{\gamma}}$$

$$P(T>t \mid Y=0, \underset{\text{age at entry}}{a}) = \frac{S_0(a+t)}{S_0(a)}.$$

$$P(Y=0 \mid \underset{\text{covariate}}{x}) = \frac{1}{1+e^{\alpha+\beta x}}$$

$$P(Y=1 \mid x) = \frac{e^{\alpha+\beta x}}{1+e^{\alpha+\beta x}}$$

Data: $(t, \delta, x, a, \underline{y})$.

$\delta=0$ censored

$\delta=1$ uncensored dead.

t, δ, x, a are as before.

$y = \begin{cases} 0 & \text{cured} \\ 1 & \text{not cured.} \end{cases}$

The observation y could be missing.

The observation y is not equal to 0.

If $y=1$ (died due to the disease)

the likelihood is

$$L = \underbrace{\frac{e^{\alpha+\beta x_i}}{1+e^{\alpha+\beta x_i}}}_{P(Y=1 \mid x)} \cdot \underbrace{e^{-(\lambda t)^{\gamma}} \cdot \left[\lambda\gamma(\lambda t)^{\gamma-1}\right]^{\boxed{\delta=1}}}_{\text{Weibull}}$$

$\delta=1$

$\delta=0$.

If $y = 0$ the likelihood is

$$L = \Bigg[\underbrace{\frac{1}{1+e^{\alpha+\beta x}} \frac{S_0(a+t)}{S_0(a)}}_{\text{curred}} + \underbrace{\frac{e^{\alpha+\beta x}}{1+e^{\alpha+\beta x}} e^{-(\lambda x)^{\gamma}}}_{\text{not cured}} \Bigg]^{1-\delta}_{\text{survival}}$$

$$\Bigg[\underbrace{\frac{1}{1+e^{\alpha+\beta x}} \underbrace{f_0(a+t)}_{\text{density}}}_{\text{curred}} + \underbrace{\frac{e^{\alpha+\beta x}}{1+e^{\alpha+\beta x}} \lambda\gamma(\lambda x)^{\gamma-1} e^{-(\lambda x)^{\gamma}}}_{\text{not curred}} \Bigg]^{\delta}_{\text{dead}}$$

0.6

$P(0 < x < 1 \mid x \geq 0)$

$P(1 < X < 2 \mid X \geq 1)$

$P(1 < X < 2) = P(1 < x < 2 \mid x \geq 1) \cdot \underline{\underline{P(X \geq 1)}}$